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Rear Admiral Bartholomew W. Hogan MC USN - Surgeon General
Captain Donald R. Childs MC USN - Editor

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Status of Rickettsioses in the United States

The major medical problems connected with the rickettsioses affecting the human inhabitants of the United States have been solved. Nevertheless, rickettsial diseases continue to incapacitate nearly 1,000 Americans each year, and a number of facts lead toward the conclusion that elimination of the reckettsioses of man will not occur in our time.

One of the main reasons for the last statement is the fact that causal agents of the four rickettsial diseases currently most important in this country—spotted fever, murine typhus, Q fever, and rickettsialpox—are maintained in nature in arthropods and animals. Man is not a necessary part of their ecologic pattern; he is only accidentally involved in the infection cycle, and, when afflicted, does not pass on the organisms to man, arthropods, or animals. Man is a dead-end for these rickettsiae. Until these agents are eliminated from their arthropod vectors and animal reservoirs, people will continue to contract these diseases.

Spotted Fever. The highest attack rate of spotted fever in the U. S. (150 cases per one million persons per 5-year period) occurred in Wyoming. Three other states in the Rocky Mountain region had rates of 25 to 50 cases. In this area, the wood tick Dermacentor andersoni is the important vector of Rickettsia rickettsii, and a number of mammals serve as hosts. In the East, where the dog tick, Dermacentor variabilis, is the principal vector, and dogs, field mice, and rabbits serve as hosts, the highest attack rates in man occurred in Virginia, with 66 cases per one million persons. However, in Maryland, North Carolina, and Georgia, spotted fever was relatively common, with 25 to 50 cases occurring in each one million of inhabitants over the 5-year period. During the same time, spotted fever occurred in all but seven states, Maine, Vermont, Rhode Island, Connecticut, Michigan, Wisconsin, and Minnesota, with the first two states never having reported cases.

Almost 500 cases of spotted fever occurred annually over the 15-year period, 1935 to 1950, with a mortality rate of 22% throughout most of the years. A gradual downward trend of the mortality curve from 1944 to 1948 was attributable to the introduction of para-aminobenzoic acid therapy and improved supportive measures. The impact of highly specific antibiotics on mortality rate became apparent by 1950. In 1955, mortality from spotted fever was about 3%, with a rise to 5.4% in 1956, and 7.5% in 1957. Along with the drop in mortality rate, the morbidity rate has declined—300 cases per year from 1951 to 1956, and 240 in 1957.

Reduction in the total number of cases of spotted fever in recent years cannot be attributed to any recognizable change in the epidemiology or ecology of the disease. Widespread use of the broad-spectrum antibiotics may have indirectly affected the number of reported cases. Whether the decline in total reported cases represents a true fall in incidence or is an artifact, there are reasons to anticipate increased incidence of the disease in certain sections of

the country during the next several decades. Maryland provides an example in point through its projected urbanization of the countryside around Baltimore and Washington. This region is an endemic area of spotted fever.

What will be the lines of defense against a probable increase of spotted fever in selected areas undergoing suburbanization? Spotted fever vaccine will probably not return to favor because specific antibiotic therapy is now available, and large numbers of persons would require immunization in order to benefit the few who might become infected. It would seem more practicable to continue the present policy of educating physicians to recognize spotted fever in order that they may be alert to the disease and promptly institute adequate specific therapy. Use of insect-repellent lotions by persons subject to exposure might be employed more widely, thereby reducing insect bites and possible disease.

Murine Typhus. A peak of 5,401 cases of murine typhus occurred in 1944 with 193 deaths. Subsequently, there was a precipitous drop with the current reports indicating about 100 cases a year. Extensive health programs dealing with improved sanitary practices, rodent control, and the use of insecticides has played an important part in the rapid decline, although certain natural factors must be taken into consideration. These factors resulted in a rapid fall of the occurrence rate during the years just prior to widespread domestic and agricultural use of DDT and other insecticides.

Both murine typhus and bubonic plague are enzootic diseases of commensal rodents and are transmitted to man by fleas. Plague is famous for its pandemics which recur at long intervals, and for the cyclic recurrence of epizootics and epidemics at intervals of several decades in endemic areas. The murine typhus cycle may result in large part from natural phenomena of the general type which are operative in plague.

The most practical and efficient method for breaking the transmission cycle of murine typhus involves control of vector fleas by insecticides. Other measures effective in control of the spread of the disease include concern with general sanitary measures and procedures which result in decreasing rat populations.

Over the years, the number of deaths from murine typhus has varied directly with the total cases, and mortality has remained at about 3.5% despite introduction of specific therapy—chloramphenicol or broad spectrum antibiotics—in 1948.

In the foreseeable future, with use of practical measures which are not prohibitive in cost, murine typhus will be eradicated in enlightened urban and rural communities. However, in almost all of the endemic areas of the U.S., public health and agricultural practices will merely hold the enzootic disease to a relatively low level.

Q Fever. Q fever differs from other human rickettsial diseases in its route of infection—entry through inhalation of rickettsiae-laden dust or ingestion of infected milk. It is diagnosed most frequently in California, where,

1952 - 1956, between 60 and 100 human cases were reported annually. In the southern part of the State the dairy cow is the main source of infection; in the northern part, sheep and goats are the culprits. Serologic surveys show that R. burneti is distributed in cattle throughout the western states, and recent developments indicate the spread of Q fever into the Middle West. A large number of infected cattle have been found in southeastern Wisconsin. In this area, almost one-fourth of the human inhabitants gave serologic evidence of prior Q fever. This infection has also been found in herds of cattle in widely scattered counties of Ohio, indicating that Q fever is on the march east of the Mississippi, and that normal traffic in cattle will continue to spread the disease among domestic animals which in turn will infect man.

Usable measures for controlling the spread of disease in man include adequate pasteurization of all milk, and immunization with vaccines for those persons who are appreciably exposed to infected environments.

Rickettsialpox. This infection was first recognized in New York City in 1946. Huebner and Armstrong established the etiologic agent as Rickettsia akari, the vector as the mouse mite, and the reservoir as the house mouse. About 200 cases are diagnosed annually, mostly in New York City, but a few are reported along the Atlantic seaboard from Philadelphia to Boston, and at least one case has occurred in Cleveland.

Miticides, rodenticides, and general sanitary measures could be expected to eradicate infection in a given area. It is doubtful that an intense effort will be made to eradicate rickettsialpox from a large area. Therefore, about the same number of cases will continue to be encountered each year.

Epidemic Typhus. This disease, the most important member of the rickettsial group from the worldwide point of view, is of little consequence to those living within the United States. In epidemic typhus, man himself serves as the only known reservoir of the agent. In the U.S. at this time, it occurs only as the recurrent form of the malady, Brill-Zinsser disease, found in areas of concentration of body lice. In populations free of body lice, patients with recurrent typhus constitute no threat to the community. In this respect, it is significant that the seasonal migration of farm laborers from Mexico increases annually, and that these transient residents are now employed throughout the West. As long as epidemic typhus exists in the land of our neighbors to the South, the itinerant Mexican laborer may supplant the eastern European immigrant as a potential source of Rickettsia prowazeki in the United States.

It is worth recalling that the current freedom from epidemic typhus and infestation with body lice depends as much on the high general standards of sanitation as it does on specific control measures, such as lousicides, specific vaccines, and specific antibiotic therapy. The capacity to maintain supplies of each of these deterrents would disappear with the first shower of H bombs. The question, then, is not whether epidemic typhus would appear among survivors of an atomic holocaust; but, how soon would it appear? (Smadel, J.E., Status of the Rickettsioses in the United States: Ann. Int. Med., 51: 421-435, September 1959)

Criteria for Operability of Mitral Valve Lesions

Ten years have elapsed since stenosis of the mitral valve was shown to be a surgically remediable lesion. Because effective surgery is now the province of a number of clinics, a great deal has been learned about rheumatic heart disease in its varied aspects, and today there should be an unassailable hemodynamic formula or formulae for the selection of the patient for operation. Unfortunately, there is still no simple answer.

The most direct approach to the assessment of a significantly stenotic mitral valve would appear to lie in measurement of the diastolic pressure gradient across the valve. Catheterization of the left heart has rendered this feasible. However, the gradient is a reflection of at least three variables: degree of stenosis, blood flow across the valve, and time during which flow passes the valve.

A considerable body of data has been secured by right heart catheterization, although this information is less direct. Utilizing this technique and measuring heart rate, blood flow, and pressure, it has been learned which hemodynamic alterations are found in patients with mitral stenosis and which variables will be returned toward normal by successful surgery.

At present, there are six hemodynamic patterns that can be found in patients with auscultatory findings of mitral stenosis. The expected and most universally accepted picture is that in which at rest there is moderate to severe pulmonary hypertension, elevation of pulmonary wedge pressure, and cardiac output that is slightly or moderately reduced. These findings occur at heart rates from 60 to 100 per minute. The pulmonary artery pulse pressure is strikingly increased. The mean pulmonary wedge pressure is quantitatively the same as the pulmonary artery diastolic pressure.

Pulmonary artery systolic and pulse pressures are seen to rise more strikingly than diastolic because they are influenced not only by elevation of the left atrial pressure, but also by the distensibility characteristics of the vessels themselves, the caliber and elasticity of the vessels, the volume of blood in them, and pulsatile flow. In reviewing available data, one is struck by the tremendous variation in the level of cardiac output. Attempts at correlation with pulmonary artery pressures or wedge pressures yield no consistent results. Correlations with such calculations as "pulmonary vascular resistance" and "mitral orifice size" prove little as the level of blood flow is an integral part of these calculations. It is suggested that the integrity of the ventricular pump may well play a role.

The majority of patients who demonstrate this first pattern should have a successful result from mitral surgery. The abnormal vascular pressures return toward normal, although the cardiac output does not show the same striking change. The best explanation for this lies in the fact that existing myocardial damage has not been reversed by surgery and that mitral block is not the sole regulating factor in determining the level of cardiac output.

Another hemodynamic pattern that may be encountered is similar to the first one except for a much greater magnitude of pulmonary hypertension. Perhaps this is an indication that the limits of distensibility of the system have been reached. The pulmonary wedge pressure does not show such a marked change, a consequence of anatomic changes in the walls of the pulmonary vascular tree.

The third group represents mild but significant mitral block. Patients often complain of dyspnea, particularly when under more than usual duress. Cardiac size is slightly increased and the ECG is within normal limits. Studies reveal either normal pressures or only minor elevations in pulmonary artery and wedge pressures at rest. The cardiac output may be normal or strikingly reduced. On exercise, blood flow is increased normally, but pulmonary artery pressures rise briskly, achieving levels not unlike those encountered in the first group at rest. The valve orifice is not as small as encountered in the first two groups, but under conditions of stress the stenosis becomes important. Surgery in these individuals results in a normal level of pressure on exercise.

The fourth group is hemodynamically not unlike the third at rest. Disability is as great as is encountered in those with moderate or severe resting hypertension. Repeated bouts of congestive failure are often encountered. The heart size is large and atrial fibrillation is often present. On exercise, blood flow does not increase normally, and pulmonary artery pressures either do not rise or do so modestly. Surgery does not change either the clinical course or hemodynamic picture. It is likely that myocardial insufficiency is the responsible agent for the clinical picture, valvular stenósis not being the predominant lesion.

Patients in the fourth group are most frequently confused clinically with those who have tight mitral stenosis because of the degree of their disability, but hemodynamically they can be separated. When these patients with myocardial insufficiency are in congestive failure, pulmonary hypertension and an elevation of right ventricular diastolic pressure develop; they constitute the fifth group. Their resting pulmonary hypertension might lead to consideration of mitral block rather than advanced myocardial insufficiency. The true state of this group can be clarified by the finding of an elevated right ventricular end-diastolic pressure and by the rigorous use of all medical therapies. If such patients are studied following the relief of congestive heart failure, marked falls in the lesser circuit pressures will be noted. In the authors' experience, surgery has not altered the clinical or hemodynamic picture of these patients.

Patients who display normal cardiodynamics at rest and during exercise give no indication for surgery, and constitute the sixth group.

While successful surgery in mitral stenosis has permitted a definition of the hemodynamic consequences of this lesion, mitral regurgitaion has not proved amenable to operation. There is insecurity in stating which patient

with mitral insufficiency should be offered surgery. At present, it cannot be stated which hemodynamic abnormalities may be ascribed to mitral valve insufficiency, which laid to resulting or concomitant ventricular damage, or which reflect associated valve lesions. Identification of a significant lesion is problematic. Therefore, hemodynamic indications for repair of this lesion cannot be stated. (Harvey, R.M., Ferrer, M.I., A Consideration of Hemodynamic Criteria for Operability in Mitral Stenosis and in Mitral Insufficiency: Circulation, XX: 442-450, September 1959)

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Irritable Colon Syndrome

A patient who seeks relief from intestinal discomfort believes his sickness is caused by some organic disease. Such patients are receptive to suggestion, and descriptions of their discomforts are often extremely convincing of organic disease. The physician must pursue an economical and practical, yet conclusive, diagnostic routine. The objective of the examination is proof of presence or absence of organic disease.

Organic diseases of the intestine that must be distinguished from functional disorders include (1) congenital malformations, (2) infections and infestations, (3) allergic state, (4) hormonal disorders, (5) diseases of unknown origin, and (6) neoplasms. Careful history and examination point the way toward the logical line of investigation.

The irritable colon syndrome is a neuromuscular disturbance of the intestine, most prominent in the colon and characterized by feelings of pressure or pain in the abdomen, by constipation, and diarrhea. It may occur along with, or may alternate with, other motor disturbances, such as duodenal irritability simulating duodenal ulcer, biliary dyskinesia, and other less well-defined syndromes. Often, it is accompanied by other symptoms and signs of a labile vegetative nervous system, such as erythema, dermographia, dryness of the skin, cold hands, instability of the cardiovascular system, and in extreme instances, low-grade fever.

Neuromuscular disturbance in the colon is of diencephalic origin with transmission to the entire intestine by the autonomic nervous system, creating a generalized neuromuscular instability. This disorder may arise in response to heredity, environment, or psychic tension. Every complaint of a patient presents two components—amount of physical disability present, and reactions of the nervous system to this disability, real or spurious.

An influence of heredity which often is not considered is the transmission of psychic traits or simple instinctive tendencies. Each instinctive tendency has constituents of knowing, feeling, and striving. When one is born he is endowed with potential mental and physical capabilities—a mixture of those of his progenitors. A hereditary tendency toward functional intestinal disorders no doubt is of significance in some families.

Environment can be divided into physical environment and psychic environment. The latter is created to some degree by the individual and consists of successes and failures in individual adaptation to the ever changing forces of the physical and social aspects of environment. People have done much to stabilize the physical factors of their environment, but in doing so they have imposed upon themselves an exacting, competitive, and machine-like routine of life. They are haunted by the desires and ambitions of their families. Such ambitions often create psychic tension and fatigue as well as somatic disorders that can produce or simulate organic disease.

Fear and anxiety are often prominent features in controlling the conduct of many who are ill from psychic tension. They are often related to the person's temperament. A state of psychic tension often antedates onset of functional digestive symptoms. Such patients often are trapped and find no safe way of escape without sustaining more psychic trauma.

The most constant characteristic of the irritable colon syndrome is the presence of discomfort or pain in the abdomen, not definitely associated with any phase of digestion or defecation. This pain accompanies exacerbation of colonic dysfunction, occurs at irregular intervals, and lacks the periodic regularity of duodenal ulcer. Location, intensity, and duration of the pain are variable. It may simulate specific pain syndromes to the point that surgery is performed.

Constipation frequently is a manifestation of the irritable colon syndrome. However, there are many stable and stoic persons who are constipated from causes which are not necessarily associated with this syndrome.

Another common complaint of those experiencing the irritable colon syndrome is diarrhea. What constitutes diarrhea for a particular patient depends on the bowel habits that he considers to be normal during health. Both acute and chronic diarrhea may be caused by psychic influences. The history will often separate that due to organic disease from that caused by psychic factors. A common cause of diarrhea is self-medication. Many drugs used as vehicles and placebos may be the source of ill-defined intestinal disorders simulating the irritable colon syndrome.

Carbohydrate foods in excessive quantity may cause intestinal disturbances. Excessive amounts of fat in the diet may cause nausea and vomiting or result in excessive amounts of feces passed at frequent intervals.

The patient who has symptoms caused by psychic tension often complains of a sense of indescribable danger and impending illness, irritability, insomnia, anorexia, and slowed thinking. Difficulty in breathing, palpitation, vertigo, weakness, increased sweating, dysmenorrhea, and headache also may occur.

In patients who have functional disorders of the colon, the general examination does not disclose any evidence of loss of body weight unless anorexia, sitophobia, functional vomiting, or diarrhea is present. Examination of the abdomen gives normal findings except for subjective discomfort. Cold, moist

hands and feet, dry mouth and lips, variable pulse rate and blood pressure, tenseness, and hyperactive tendon reflexes may be observed.

In the presence of intestinal disorders associated with diarrhea, the following examinations should be performed in the order given: (1) study of feces for ova and parasites; (2) examination of blood and urine for evidence of poisoning by certain chemicals; (3) proctosigmoidoscopy; (4) roentgenographic studies of the stomach, colon, and, occasionally, the small intestine; (5) determination of basal metabolic rate if hyperthyroidism is suspected; and (6) bacteriologic cultures of the stools as well as determination of fat content.

When organic and functional intestinal disease coexist, evaluation of the degree of each is required. In many instances, a period of observation and repeated examination is required before organic and functional disorders of the intestine can be differentiated.

Patients suffering from irritable colon syndrome fall into two groups. The first comprises those who are intelligent and have a basis for their fear. They are temporarily unadjusted and will recover if proper advice is given. The second group includes patients whose judgment is fallacious. They believe they have an intestinal disorder, and that their complaints and "case" are different from any the physician has ever seen. They are miserable, arrogant, evasive, and resistant to treatment.

During treatment of the irritable colon syndrome, the physician must be thoroughly convinced that the patient's symptoms are not caused by manifest or occult disease of the digestive system. Also, the physician must be aware that psychic tensions of lesser severity can produce pronounced degrees of intestinal neuromuscular dysfunction in those who have been weakly fortified by heredity against the vicissitudes of life and unpleasant environments.

In discussions of treatment with the patient, emphasis is focused on the causes of discomforts, and suggestions as to how the patient can make adjustments in order to overcome the causes. An axiom of Bockus cannot be overemphasized: "Those who approach the problem of the colonic neurosis with a sense of serenity and smugness, emphasizing only routine stereotyped methods, are doomed to frequent failure."

Discussions with the patient from time to time are necessary in order to ascertain the relative significance of his anxieties or psychic tensions, and his habits of work, rest, eating, drinking, recreation, and sleep. A bland diet is tolerated in most instances better than a restricted one, care being taken that it is well balanced. Belladonna and phenobarbital may be required for relief of abdominal discomfort and simple measures for correcting constipation should be employed. More vigorous measures may be employed as indicated. Psychiatry and psychotherapy have a definite place in the treatment of some patients who have a colonic neurosis. However, good criteria cannot be given for the selection of that particular patient, and psychiatric advice may be required. (Wakefield, E. G., Functional Disorders of the Colon - The Irritable Colon Syndrome: Postgrad. Med., 26: 365-374, September 1959)

Immunity, Infection, and Properdin

The word "immune" derives from the Romans who used it to describe those persons declared exempt from taxation and other obligations to the state. Later, the understanding of the word changed from the concept of "exemption" to the connotation, "rendered safe." In this sense the word is applied to that state in which animals are protected or rendered safe from an infectious agent either by prior infection or by experience.

Refractoriness to infection cannot be considered as an all or none occurrence. Infection is the resultant of the interaction of all the various forces of both the infectious particle and the involved host. Each of the multitude of reactions is subject to biologic variability and to random hazards of chance occurrences.

The first requirement for successful infection is penetration of the host integument by the infectious agent. With the rare exception of those few unusual infections which are introduced directly into tissues or blood by third-party vectors, all infecting agents must pass this barrier. Circulating immune factors play little part in resisting the act of penetration by the infecting agent.

After penetration, "primary lodgment" or "nidation" takes place before further invasion occurs. This is the "decisive period"—a matter of minutes or hours—during which serologic factors may first have an effect in "natural resistance." Following this stage, direct local extension of the lesion may damage some vital structure and it would presumably be resisted again by local forces. Alternatively, following widespread dissemination, occurring through lymphatic or hematogenous seeding, serologic factors would logically be expected to have their greatest effect, either by actual destruction of the agent or by potentiating removal and sequestration of the agent by tissues containing phagocytic cells. Without actual extension, host tissue damage may be brought about by endotoxins or exotoxins and released by the invading organism. These may be neutralized by serologic factors. The classic reaction of toxin and antitoxin is perhaps the best and most easily demonstrable specific example of the protective role of antibody.

Careful control of experimental conditions has made it apparent that a remarkable number of defense mechanisms exist. In any one infection perhaps only a few of these are called into play. However, all must be considered in the evaluation of the over-all response—resistance to infection.

For many years, the activities of a particular serum protein were recognized, and led to the assumption that it should play some role in natural resistance to infection. With complement and magnesium, it was known to lyse certain bacteria and erythrocytes, inactivate some viruses, and destroy at least one protozoan. Properdin was the name given to the protein, being derived from the Latin pro and perdere, meaning to prepare to destroy. There is discussion as to whether properdin is or is not an "antibody." Available

data at this time suggest that it is probably a distinct protein with multiple biologic activities.

Properdin is antigenic. Accumulated data suggest that it is a single substance antigenically and that the bactericidal, erythrolytic, and virus-neutralizing activity are identified with the same antigenic material.

Properdin is found in the sera of almost all normal mammals. Apparently, it has a variety of activities against infectious agents in vitro. It would seem logical that it should have some biologic function in vivo. Such a function has yet to be demonstrated. However, this is not an unusual circumstance, as it has been difficult to show a protective role for many other serum factors in the intact animal.

Properdin titers in man have been found to vary from the normal range in a variety of diseases. The effect of administration of the protein to experimental animals has also been studied. Under some selected circumstances, there has been an associated increased resistance to infection and irradiation.

Thus, while data are available indicating increased natural resistance following administration of properdin or substances which increase properdin levels, evaluation of the data does not allow the interpretation that properdin has any influences in itself. However, the fact that it exists in serum, has many biologic activities in vitro, and is related to change in resistance in vivo, makes it probable that there is some biologic role and that this should be demonstrable in the future by proper techniques. (Wedgewood, R. J., Immunity, Infection, and Properdin: A. M. A. Arch. Int. Med., 104: 497-505, September 1959)

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Carcinoma and Diverticula of Colon

The fact that diverticulitis and diverticulosis may mask or mimic carcinoma was first stressed by Moynihan in 1906. Since that time, numerous observers have recognized this problem. One observer noted that carcinoma and diverticulitis could not be differentiated in 25% of 105 cases. In another series, roentgen diagnosis was correct in 57% of 30 patients.

A certain danger of this simultaneous occurrence of diverticulosis-diverticulitis and carcinoma lies in the attitude of physicians, radiologists, and surgeons toward this disease. Statements to the effect that diverticulosis produces no symptoms and warrants no treatment tend to lull the unsuspecting physician into a false sense of security. It behooves every clinician to look upon colon diverticula with suspicion, especially those of the sigmoid, because the coexistence in that region of carcinoma and diverticulosis is of higher incidence than was once thought to be true.

Furthermore, the percentage of aged people in America is increasing rapidly. According to Shackelford, the incidence of diverticulosis in the

general population is 3%, or 5,000,000 persons. The lesion occurs in 5 to 15% of all persons over the age of 40, and 66% of all who reach 85 years of age. Of persons having diverticulosis, 20% are destined to develop inflammatory disease. Of these, 10 to 15% will require operative treatment, of whom 5 to 10% may be found to have carcinoma eventually associated with the condition—10,000 to 15,000 cases. It is these cases of potential carcinoma and diverticulosis-diverticulitis coexisting that deserve attention. This study hopes to help by focusing renewed interest on the age-old problem.

In the authors' study of 355 cases of carcinoma of the colon in a 5-year period (1953 - 1957), 75 (21%) were found to have associated diverticulosis, 35 in close conjunction with the carcinoma. Diverticula occurred in the sigmoid in 56 cases (74. 7%).

In the group with coexisting disease, some change in bowel habits was the most prominent symptom (83%), followed by constipation, flatulence, and blood in the stools. Weight loss—more in keeping with carcinoma—was significant in 45% of the patients. Left lower quadrant pain and generalized abdominal distress were present in slightly less than half of the patients. The pain was lower abdominal, cramp-like, and colicky, even simulating appendicitis except for location on the left side.

Abdominal tenderness, especially left lower quadrant, was the most common objective finding. An abdominal mass was palpable in 15 of 35 cases. In only 2 cases had complete obstruction occurred before admission.

Anemia, secondary to loss of blood, was noted in 37%, while 48% had blood in the stool.

On proctoscopic examination, 20 of 34 patients showed carcinoma. Cytologic examination of smears was not employed. Barium enema was performed in all 35 cases of sigmoid carcinoma. In 32 diverticulosis or diverticulitis was noted, but in only 16 could a definite differentiation be made between carcinoma and the benign conditions. The presence of diverticula should not be considered as evidence that carcinoma is absent in any given case.

There is general agreement that the proper treatment for carcinoma of the sigmoid colon is left colectomy. Diverticulitis, when uncomplicated, is managed medically. Surgery is advocated when differentiation between carcinoma and diverticulitis cannot be made. The authors are in agreement with recent trends in which surgery is being used more frequently in diverticular disease. Mortality rates have been reduced substantially.

Prognosis for patients with diverticulitis and carcinoma has been poor. Rauch has shown that 15% of patients having previous inflammatory disease with carcinomas survived 5 or more years after resection. Another group, free of prior inflammatory disease, showed a 32% survival for 5 or more years.

In view of the serious danger of overlooking a carcinoma in cases of diverticulitis, the authors endorse recent more aggressive attitudes. They consider that this will relieve the patient of much morbidity from possible obstruction

which will then require colostomy, resection of the lesion, and closure of the colostomy.

Relative indications for surgical intervention are: (1) persistent mass, (2) repeated bleeding, (3) tenesmus, (4) increasing constipation, (5) persistent tenderness and evidence of inflammation, (6) poor response to medical therapy, and (7) equivocal x-ray diagnosis.

The operation of choice in 35 cases of carcinoma of the sigmoid with associated diverticulosis was resection of the left colon without colostomy. Total colectomy was performed in 3 cases for multiple colonic carcinomas with associated diverticulosis. No postoperative mortality occurred in this group.

Any person having diverticulosis and diverticulitis should not be considered to have an insignificant "garden-variety" disease of the colon. Such patient should be followed persistently with repeated proctoscopic examinations and barium enema studies, since he may have symptoms of constipation, bowel habit change, and abdominal distress indistinguishable from carcinoma. An aggressive attitude will undoubtedly save lives in the future in a population which is aging and destined to have more and more colonic diseases.
(Ponka, J.L., Fox, J.D., Brush, B.E., Coexisting Carcinoma and Diverticula of the Colon - A Review of Three Hundred and Fifty-Five Cases of Carcinoma of the Colon: A.M.A. Arch. Surg., 79: 373-384, September 1959)

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Research and the Continuing Education of the Physician

Education is a continuing process which is dependent on active studying. The best of all study results from application of one's energies to elucidation of problems to which the answer is not known. This is usually called research.

There are many ways in which research may be pursued. It is always concerned with wondering, pondering, dreaming, and speculating about the subject. It always has to do with formulation of problems; it is searching that is important—not getting the answer.

Medical people vary widely in their essential interest in investigation. It is a great mistake to think that the habit of inquiring and the genius for searching are limited to those who devote their lives to organized research. The searching of a busy practitioner is of a different intensity, spread at first over a broad area of his practice. Then, scrutiny may lead to observations that demand focal study, sometimes with the help of others.

The practicing physician has many opportunities to engage in useful research work. It is of first importance that he study in a field that he knows, and that his projects be concerned with some aspect of his regular work. Active studying stimulates the teacher, clarifies his ideas, and helps him

gain a clearer vision of fundamental principles, making him a better teacher. In a similar way, it stimulates the practitioner, sharpens his powers of observation, and throws light on his daily problems, making him a better doctor. Good habits of thinking, observing, planning, discriminating, and judging are engendered and nurtured by persistent searching. These habits of investigation come to be used in all that one does—their development requires constant application.

A research hobby outside one's regular work is seldom helpful. Such diversion may tend to reduce a practitioner's interest in his patients and their disorders. However, if he has great talent for more fundamental research, it may lead him into full-time research in the field of his interest and aptitude.

Pursuit of research in practice is not, and should not be, a separate component of a physician's life. It does not usually begin as a conscious effort in one field. It never comes with ease, but only after long effort and disciplined thinking. "Clinical research ranges from the making of observations which are incidental to, and inseparable from, good practice, to systematic investigations undertaken deliberately and often over long periods with the object of answering specific questions." Its practice may lead to formulation of specific questions and prosecution of more systematic research.

The question is often asked, "How should a practitioner begin his study?" It may be answered—to paraphrase Peabody's famous remark about care of patients—by saying that the secret of the study of patients lies in studying one's patients. To further the study there are certain practices to be followed and habits to formed.

One has to do with keeping of good records. This practice focuses one's attention on the more significant observations and provides data for later examination and study.

Another is concerned with the habit of thinking and pondering over interesting findings, difficult problems, and striking phenomena. This skill is developed only with practice until it becomes a habit.

Such practices lead to consideration of each difficult case as a problem which can be solved by data at hand or easily obtained—a practical research attitude which, if persisted in, will soon provide a rich background of knowledge.

Careful preparation of reports in clear appropriate terms is a necessary part of the discipline of research. It opens one's conceptions to exacting scrutiny and shows up shortcomings and imperfections of observations and impressions. Examination of data and formulation of opinions comprise a constructive effort from which ideas arise to prepare the ground for making significant new observations.

The most deleterious adverse influence on prosecution of research is being too busy to have time to think, too weary and preoccupied to read or wonder. Under such circumstances, it is easy to slip into mechanical

procedures. As Ritchie has said, "It is a standing temptation of mankind to put routine, which calls for no thought and little effort, in place of judgment which calls for both." Development of judgment is essential for all good studying.

Almost as bad is to have a false conception of research—to think it can be done easily. What is done easily will neither answer important questions nor promote one's education. Failure to realize the need for hard disciplined thinking and constant scrutiny of one's observations and deductions is almost an insurmountable handicap.

Other retarding influences include the attempt to do so much that little can be accomplished because of failure to restrict the focus of one's studies; deviation of one's efforts to make use of expensive equipment and recording devices in the belief that the use of these instruments is more scientific than the direct pursuit of one's problems by simple appropriate methods; and desire for the glamour and prestige of research rather than for the interest, pleasure, and satisfaction of searching.

The practitioner has a special vantage ground for certain types of study. He can follow the natural course of disease and its modification by all manner of influences. He can study the efficacy and dangers of new remedies. Every effective measure opens new avenues for research. Each great advance raises many more questions than it answers. Any clinical field in which there is nearly universal acceptance of current ideas is ripe for critical questioning.

The great contribution of practitioners as a body cannot be cited in individual instances. The accumulated good sense of a large number of thoughtful physicians has a wonderful influence. It dampens the excessive swings of medical fashion, buffers the overly enthusiastic claims for ill-founded methods, acts as ultimate jury in clinical trials, and has a firm, strong, educational influence.

The critical research attitude of honest thinking and penetrating doubt on the part of the physician in active practice is a catalyst which speeds up the learning process and gives new knowledge at a different but important level. It broadens his mind, increases his comprehension, and, by its inherent discipline, raises the standard of all aspects of his practice and of that of his closer associates. (R. F. Farquharson, M. B., F. R. C. P. (C), Toronto, Canada, Value of Participation in Research in Continuing Education of the Practicing Doctor: J. A. M. A., 171: 112-115, September 5, 1959)

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Vending Machine Evaluation Program

Examinations for certification of compliance under the National Automatic Merchandising Association Vending Machine Evaluation Program are conducted by the Department of Microbiology and Public Health, Michigan State University, and the School of Public Health, Indiana University Research

Foundation. Sanitary evaluations are based upon compliance with "The Vending of Foods and Beverages - A Sanitation Ordinance and Code - 1957 Recommendations of Public Health Service." The current Listing of Letters of Compliance awarded to various manufacturers may be obtained from: National Automatic Merchandising Association, 7 South Dearborn St., Chicago 3, Ill.

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Navy Medical Department Participation in Professional Meetings

Occupational Therapy Association

LCDR Barbara Munroe MSC USN, staff occupational therapist at U. S. Naval Hospital, Philadelphia, Pa., represented the Bureau of Medicine and Surgery at the American Occupational Therapy Association's annual conference held in Chicago, Ill., 16 - 23 October 1959.

American Public Health Association

LCDR Harry W. LeBleu MSC USN and CWO Ralph T. Goerner, Jr., USN attended the convention of the American Public Health Association at Atlantic City, N.J., 19 - 23 October 1959. They monitored a Preventive Medicine Division exhibit which introduced the Manual of Naval Preventive Medicine. LCDR LeBleu is presently Head of the Environmental Sanitation Section and Mr. Goerner is Head of the Safety Section and Assistant in Sanitation Section of the Bureau.

Armed Forces Obstetrical and Gynecological Seminar

Approximately 150 service Medical officers and civilian physicians attended the Sixth Armed Forces Obstetrical and Gynecological Seminar at the U.S. Naval Hospital, Portsmouth, Va., 26 - 28 October 1959. Most of the Chiefs of Services of the various naval hospitals and other members of the departments attended the meeting, and, with representatives of other services, presented papers, participated in panel discussions, or moderated sessions. Many distinguished civilian physicians and teachers from various medical centers of the east coast contributed to the effectiveness of the meetings by discussing presentations and serving as panel members for round-table discussions. Of particular interest were the reports on extensive statistical analysis of ruptured membranes occurring in naval hospitals, acridine orange fluorescent microscopy technique, isotope localization of the placenta, and progress in treatment of ovarian and cervical cancer. William T. Ham, Jr., Chairman, Department of Biophysics and Biometry, Medical College of Virginia, an authority on radiation hazards, presented a guest lecture, "Irradiation Hazards to Fetal Tissue."

Chairmen of Departments of Surgery

CAPT J.J. Timmes MC USN, Chief of Surgery, U.S. Naval Hospital, St. Albans, N.Y., represented the Surgeon General at the Conference of Chairmen of Departments of Surgery, Brookhaven National Laboratory, Upton, N.Y., 26 - 27 October 1959. The conference, sponsored by the Division of Biology and Medicine (Atomic Energy Commission) and the Medical Department of Brookhaven National Laboratory, was the fourth in the series, and had as its theme, "Nuclear Medicine in Surgical Research and Practice."

Military Medico-Dental Symposium

The tenth annual Military Medico-Dental Symposium at the U.S. Naval Hospital, Philadelphia, Pa., was held 28 - 30 October 1959, under the sponsorship of the Commandant, Fourth Naval District. The theme, "Environmental Medicine," was designed to bring together results of the latest research and development by outstanding leaders in their fields.

Association of American Medical Colleges - MEND

RADM Edward C. Kenney MC USN, Deputy and Assistant Chief of the Bureau, attended the annual meeting of the Association of the American Medical Colleges in Chicago, Ill., 1 November 1959, as representative of the Surgeon General. He also participated in the meeting of government representatives and educators on Medical Education for National Defense (MEND) where he spoke on training opportunities in the Medical Department of the U.S. Navy.

CAPT Bennett F. Avery MC USN, National Coordinator for the MEND Program of the United States, and CAPT Malcolm W. Arnold MC USN, Head of the Training Branch, Professional Division of the Bureau, also attended the meeting. CAPT Arnold participated in a joint meeting of the Federal MEND Council and the Committee of the Association of American Medical Colleges, presenting the military aspects of the program for which the Navy is Executive Agent. CAPT Avery also participated in the meeting of the Council-Committee, which cooperates to establish policy for the program. Subsequently, CAPT Avery addressed the assembled deans of the nation's medical schools to advise them of the progress of the program and of the plans for its future.

Seventy of the nation's 85 undergraduate medical schools are now affiliated with MEND and receive annual grants designed to extend and improve teaching of military and disaster medicine. The office of the MEND National Coordinator sponsors symposia on subjects related to defense and disaster medicine, and arranges for attendance of medical school faculty members. Other functions include distribution of professional literature relevant to MEND, publication of lists of speakers to address medical school faculties and students on related topics, and dissemination of information to medical schools on appropriate aspects of the Federal Government's medical activities.

County Medical Societies Civil Defense Conference

CAPT Reginald R. Rambo MC USN, Assistant for Personnel Control and Planning, Personnel and Professional Division of the Bureau, attended the Tenth County Medical Societies Civil Defense Conference in Chicago, Ill., 7 - 8 November 1959, as the representative of the Bureau of Medicine and Surgery.

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Change in Military Training Credit for American Board of Psychiatry and Neurology

The Surgeon General has received a letter from the American Board of Psychiatry and Neurology, Inc., which states a change in policy of establishing credit for training while on active duty in the military services.

> "At the last meeting of the Board, the action regarding training credit for military service was rescinded. In order to gain training credit for full-time psychiatric work in military service, it would be necessary that this be taken in an approved residency training program, and that the Educational Director certify that the applicant was actually in residency training status and not in a service function. This action is retroactive to the date of its earliest implementation."

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Directives

From time to time attention is invited to directives that are of significant general concern. For economy of space, they are described only by number, date, subject, and a statement of purpose. Directives may be studied in detail from the complete copy which usually may be obtained at the Administrative or Personnel Office. When not available locally, copies of BuMed Directives may be obtained from Navy Supply Center, Oakland, Calif., or Norfolk, Va., or Naval Weapons Plant, Washington, D. C.

BUMED INSTRUCTION 3500.1 16 October 1959

Subj: Training materials in support of teaching program in first aid and self aid, availability of

This instruction implements SECNAVINST 3500.1 (Standardization of teaching first aid and self aid) with respect to utilization of NAVMED P-5056 (Syllabus of Lesson Plans for Teaching First Aid), and available training aids (films, moulage sets of war wounds, and practice materials).

BUMED INSTRUCTION 1520.10A 27 October 1959

Subj: Residency training of medical officers, application for

This instruction provides guidelines for the submission of individual applications for residency training. BUMED Instruction 1520.10 is canceled and superseded.

BUMED INSTRUCTION 1520.13 27 October 1959

Subj: Residency training of medical officers, reporting of

This instruction establishes a new procedure for continuing medical officers in residency training without annual formal request and approval from BUMED, and provides for reporting of residents. It applies to all officers reporting for residency training during and after fiscal year 1960, regardless of the level of training.

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From the Note Book

Interns Deferred. Pentagon has sent notifications to 947 hospital interns who were selected for deferment from military service while they undergo residency training beginning next July. Applications were received from 1,553 interns. As anticipated, there were more applicants than vacancies in surgery, internal medicine, obstetrics, and pediatrics; but there was not a single request for preventive medicine, for which Army, Navy, and Air Force had sought 46 appointees. There was only one each in occupational medicine and physical medicine. (Washington Report on the Medical Sciences, 12 October 1959)

U.S.N. Medical Research Laboratory. The October A.M.A. Archives of Surgery presents an article by CAPT Joseph Vogel MC USN, describing the functions of the Medical Research Laboratory at the Submarine Base, New London, Conn.

Hospital Staphylococcal Infections. Three articles form a symposium on the problem of hospital acquired staphylococcal infections in the October 1959 Annals of Surgery. Emphasis is placed on the need for a relentlessly aggressive attitude in relation to this continuing problem.

Digoxin in Treatment of Burns. Correlating their observations with those of others in relation to shock that accompanies severe thermal burns, the authors of this Research Report conclude that myocardial failure contributes to the low cardiac output which results in reduced peripheral circulation.

Studying reactions in dogs, they report that digoxin combined with replacement fluids is required to restore blood flow to normal or to prevent its fall. This therapy is suggested for use before fluids are available or to augment adequate fluid therapy. (Treatment of Severe Thermal Burns with Digoxin and Intravenous Fluids, Naval Medical Field Research Laboratory, Camp Lejeune, N.C., NM 61 01 09.1.11, September 1959)

Cholecystitis in Moscow. Some of the features of management of acute cholecystitis, and anesthesia employed for gallbladder surgery in Moscow hospitals are presented in this article by one of the staff of Central Institute for Improvement of Physicians. A less conservative viewpoint is presented than is usually held by physicians in the U.S. (B.K. Ossipov, Surgery, September 1959)

Intravenous Catheter. A newly available disposable sterile needle and catheter set offers considerable facility in administration of intravenous fluids over a prolonged period of time with minimal discomfort to the patient. Employment of the equipment in over 1,000 cases is described. (H. Gritsch and C. Ballinger, J.A.M.A., 19 September 1959)

Griseofulvin for Tinea Capitis. Faced with an increasing incidence of tinea capitis among school children and their preschool siblings, the District of Columbia's Department of Public Health have treated, or now have under treatment with griseovulvin, 120 children with mycotic scalp infection. Eighty-one are apparently cured and no serious side effects or toxic reactions have been noted. Treatment must be prolonged until culture confirms eradication of the organisms. (J. Kirk, M.D., L. Ajello, Ph. D., A.M.A. Arch. Dermat., September 1959)

Surgery for Arterial Insufficiency. Studies in patients with cerebral arterial insufficiency indicating extracranial occlusion in a large percentage of cases, and practical application of arterial reconstructive techniques which restore circulation represent a departure from the usual concepts of the disease and its management. (M.E. De Bakey, et al., Ann. Int. Med., September 1959)

Plastic Conduit in CA of Stomach. Segments of a plastic tube molded in the shape of the lower esophagus, stomach, and duodenum have been placed as a permanent indwelling conduit to provide palliation for patients with obstructing gastric carcinoma. (B. Eiseman, et al., Surg. Gynec. & Obst., October 1959)

Toxic Megacolon. This condition is the most dreaded complication of ulcerative colitis. Therapy must be intensive and comprehensive. Case histories are presented detailing some of the problems associated with management of this condition. (J. Roth, et al., Gastroenterology, September 1959)

DENTAL SECTION

Effects of Silver Nitrate on Human Dentin and Pulp

Silver nitrate, ammoniacal and plain, was applied to the carious dentin of 25 teeth of persons 17 to 28 years of age. A 5-minute application of ammoniacal silver nitrate followed by reduction with eugenol for 5 minutes was made on the carious dentin of 5 nonexposed and 10 carious exposed teeth. These 15 teeth were sealed with zinc oxide and eugenol cement and extracted 9 to 32 days afterward. Silver nitrate was applied to the carious dentin of 10 nonexposed teeth for 5 and 10 minutes and was followed by eugenol. These teeth were extracted within an hour following application. Upon histologic examination, it was found that silver nitrate completely penetrated the carious dentin and particles of silver could be found within the pulps of all 5 nonexposed specimens extracted 9 to 32 days after application. Silver particles were observed within degenerating odontoblasts and other pulpal cells and were deposited around capillaries. Silver nitrate had also completely penetrated the vital dentin of all carious exposed teeth. In 2 of the 10 teeth extracted within one hour after application, there was complete penetration of the dentin by silver nitrate and only superficial penetration in the remaining 8 teeth. No differences in penetration were noted between 5 and 10-minute applications of silver nitrate, and reactions of the dentin to ammoniacal and plain silver nitrate were similar. This study confirms a previous report and demonstrates that silver nitrate eventually penetrates the entire thickness of dentin and enters the pulp. (Englander, H. R., James, V. E., Dental Research Facility, Naval Training Center, Great Lakes, Ill., Abstract: International Association for Dental Research, 35th General Meeting; March 1957)

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Moral Education and Training for Leadership

Certainly, the one essential element of combat readiness is effective leadership—in the last analysis, based on morally consistent precepts and examples. Technical virtuosity keeps equipment in repair and locates the right button to push. A transient enthusiasm can move people to explosive activity, but leadership based on convictions about the rightness of our social order and of our moral institutions, and bolstered by the leader's conduct and

example is needed over the long pull to do the right thing—the right thing from the standpoint of efficiency and human relations as well as of moral rightness.

There is the well known story about the farmer who listened in silence to the many recommendations made to him by an expert from an agriculture improvement bureau and then led the expert to a bookshelf full of pamphlets and publications. The farmer said, "You're absolutely right, Mister, but look at all those good ideas ahead of you. I ain't farming now so good as I know how."

Men look to others to see how to behave, and in particular they look to those higher up the totem pole for clues to good behavior—whether it be in military situations, social situations, or moral situations. If the top man shows an interest in improving leadership and in improving conduct and performance of duty, the men under him will begin to see ways and means of educating and training themselves to heightened moral responsibility.

As Dr. Louis Finkelstein, writing in Fortune Magazine (The Businessman's Moral Failure), September 1958, put it:

> "The businessman can, without moralizing . . . transform his home into a school for moral responsibility. . . . The stories he tells, the gestures he makes, the conversation he chooses and avoids . . . without being in the slightest degree priggish, and eventually without self consciousness, he may help his family and friends obtain insight into the ethical life.
>
> "The American businessman should literally place ethics on the agenda—for himself at home and in the office, for his company and trade association. His calendar should include regular meetings of management to discuss the moral dimensions in his specific business. . . . He should put moral health on the same level as mental and physical health—indeed, above them."

If this is a valid observation as regards businessmen, how much more so is it valid for a Naval officer who is intimately associated with his men 24 hours a day in a profession whose issues are life and death, not profit and loss.

We in the Navy must not forget that we are, in the last analysis, leaders of men, and not just of technology in which we place so much confidence and to which we devote so much time.

(The Honorable Richard Jackson, Assistant Secretary of the Navy for Personnel and Reserve Forces: Excerpts from article, Naval Training Bulletin, Summer 1959)

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Procurement of Facings and Backings

The Field Branch of the Bureau of Medicine and Surgery and the Military Medical Supply Agency recently completed negotiating an open-end contract with the Columbus Dental Mfg. Co. for the procurement of porcelain and plastic facings and metal backings. A copy of this contract and instructions pertaining to its use will be mailed to all authorized Naval Dental prosthetic facilities during November.

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Air Requirements for Operation of Air Turbines

Air pressure requirements for the proper operation of air turbine handpieces vary according to the manufacturer. However, approximately one (1) cubic foot per minute at twenty-five (25) pounds per square inch should be available per handpiece. Because many variables, such as age, condition, location, and recovery period of compressors determine their efficiency, all activities requisitioning air turbine handpieces in accordance with BuMed Notice 6750 of 15 July 1959 shall determine that adequate air requirements are available to efficiently operate these units and shall include a statement to this effect in their justification.

Air turbine bearings are sensitive and contaminated air lines cause rapid destruction of the bearings and markedly interfere with the efficiency of the turbine. Compressors and lines must be adequately filtered to eliminate water and dirt.

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Dental Corps Continuous Training Program

A short course in Partial Dentures will be presented by the Naval Dental School, NNMC, Bethesda, Md., 11 through 15 January 1960. This course is intended as a refresher in the basic principles of design of the removable partial denture. Emphasis will be placed on mouth preparation, making accurate impressions, studying survey and design, recording maxillomandibular relationships, and patient education. The course will consist of lectures, demonstrations, a seminar, and individual supervision of limited exercises. Instructor for the course will be CAPT M. H. Brown DC USN, Diplomate, American Board of Prosthodontics.

Quotas have been assigned to the First, Third, Fourth, Fifth, Sixth, and Ninth Naval Districts; and the Potomac River, Severn River, and Naval Air Training Commands.

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Training for Dental Technicians

Requests for a course of instruction in Dental Technician, General (Basic), Class "A" School are desired from individuals (strikers or interviewees) in pay grades E-2 and E-3 only, who are not graduates of a class "A" School. Minimal prerequisites for assignment are listed in BuMedInst 1510.6B. Waivers for the combined GCT and ARI score (total of 100 required) may be granted up to 15 points depending on other individual qualifications. Classes convene every 4 weeks at the Naval Training Center, San Diego, Calif. There are 40 training billets in each class; 30 students are allocated directly from Recruit Training, and 10 are assigned by the Dental Division upon approval of individual request from the field. At the present time, the earliest quota available for an eligible striker or interviewee is for the class convening in February 1960.

Eligible enlisted personnel are considered for a course of instruction in a class convening approximate to rotation tour date or when due for rotation in accordance with SEAVEY procedures.

Training Billets Available to Group XI, Dental Rating. Reference: BuMedInst 1510.2B

Prosthodontics Basic, 28 billets each class, "C" School, NTC San Diego, Calif., 26 weeks, classes convene February, May, August, and November, 1960.

Repair Basic, 5 billets each class, "C" School, NDS NNMC, Bethesda Md., 41 weeks, classes convene September 1960.

Advanced General, 20 billets each class, "B" School, NDS NNMC Bethesda, Md., 26 weeks, classes convene January, July 1960.

Advanced Prosthetic, 10 billets each class, "B" School, NDS NNMC, Bethesda, Md., 26 weeks, classes convene January, July 1960.

Maxillofacial Prosthetics, billets as required, Special Instruction, NDS NNMC, Bethesda, Md., 26 weeks, BuMedInst 1510.4D.

Medical Administration, 10 billets each class, "C" School, USNH, Portsmouth, Va., 42 weeks, classes convene annually, BuMedInst 1510.4D.

Clinical Laboratory, billets as required, "C" School, Designated USNH, 52 weeks, BuMedInst 1510.4D.

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Please forward requests for change of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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Royal Navy Dental Surgeon Visits Dental Division

Surgeon Rear Admiral Charles J. Finnigan (D), Royal Navy, Deputy Director for Dental Services of Her Majesty's Royal Navy, recently visited Rear Admiral C. W. Schantz DC USN, Assistant Chief of the Bureau of Medicine and Surgery (Dentistry) and Chief, Dental Division, and members of his staff. While Rear Admiral Finnigan was in the United States, he attended the Centennial Session of the A D A in New York City, and toured various Navy Dental facilities, including the U. S. Naval Dental School, NNMC, Bethesda, Md. In a short talk at the Naval Dental School, Rear Admiral Finnigan commended the Navy Dental Corps for its worldwide contribution to dentistry and expressed appreciation for the fine relationship which exists between the Royal Navy Dental Corps and the U. S. Navy Dental Corps.

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Reserve Dental Companies Commended

RADM H. T. Deutermann USN, Commander, USNR Training Command, Omaha, Neb., recently commended the following commanding officers of Naval Reserve Dental Companies as having the outstanding Dental Company in their respective naval districts:

CAPT D. H. Nichols DC USNR-R, Company 4-6, Chagrin Falls, Ohio
CAPT W. H. DeWolf DC USNR, Company 9-6, Evanston, Ill.
CDR R. L. Foutz DC USNR-R, Company 11-4, North Hollywood, Calif.

Policy

The U. S. Navy Medical News Letter, is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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RESERVE SECTION

Correspondence Courses
Manual of the Medical Department - Parts I and II

Manual of the Medical Department, Part I, NavPers 10708-2 (Rev. 1959), and Part II, NavPers 10709-2 (Rev. 1959), are two correspondence courses recommended for all Medical Department personnel. They are designed to provide familiarity with functions of administration, organization, and management of facilities exercised by the Bureau of Medicine and Surgery. Completion of these courses will enable the enrollee to acquire essential knowledge of significant functions of the Medical Department in its relation to the Naval Establishment ashore or afloat in all of its far-flung activities, and to increase the enrollee's over-all efficiency.

Because of the extent of the material, the course has been divided into two parts. Each part is administered and credited as a complete course in itself. The courses are described here together because they deal with different parts of the same subject.

MANUAL OF THE MEDICAL DEPARTMENT - PART I. In addition to delineation of authoritative methods and procedures, the material embraces discussions of approved essential organizational structure of all types of Medical Department components. These include the Bureau of Medicine and Surgery, various field agencies in all areas of activities, regional and district medical staffs, and Medical Department organization in ships and on shore stations.

Because the Medical Department is guided in matters of administration by Navy Regulations, current directives of the Bureau of Medicine and Surgery, and the Manual of the Medical Department, certain chapters of the Manual have been selected as the principal text for the course. The text constitutes chapters 1 through 14, 17, 18, 20, 21, and 22. It incorporates page changes 1 through 6 and is a minor revision of the previous course. SecNav Instructions 6320.8 and 6320.9 relating to the Medical Service—Dependents' Medical Care, and Comptroller Fiscal Policies—Dependents' Medical Care and BuPers Instruction 1750.5A as reflected in BuPers Notice 1750 of 8 May 1957, are furnished as supplementary reading material. However, questions are not based upon this material.

The course consists of nine objective type assignments and is evaluated at twenty-four Naval Reserve promotion and/or nondisability retirement points

Naval Reserve personnel who previously completed course NavPers 10708-1 will not receive additional credit for completing the revised course, NavPers 10708-2.

MANUAL OF THE MEDICAL DEPARTMENT - PART II. The course provides Medical Department personnel with authoritative standards, methods, and procedures as they apply chiefly to three areas: property and fiscal management, forms and reports used on various occasions, and the maintenance of proper records; and proper application of standards for the physical examination of Navy personnel. Material relating to treaties and conventions which is of special significance for personnel of the Medical Department is also included.

The text constitutes chapters 15, 16, 23, 25, 26, and Appendix A. Page changes 1 through 6 have been incorporated in this material, reflecting changes in foregoing chapters. Additional material is taken from Army Regulations 40-503 (new 1956), Physical Standards and Physical Profiling for Enlistment and Induction.

The course consists of eight objective type assignments and is evaluated at eighteen Naval Reserve promotion and/or nondisability retirement points. Naval Reserve personnel who previously completed course NavPers 10709-1 will not receive additional credit for completing the revised course, NavPers 10709-2.

Applications should be submitted via applicant's command, to the Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., (Attn: Correspondence Training Division). Medical personnel may be enrolled in more than one Medical Department correspondence course at one time.

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Terminology of the Naval Reserve

Terminology commonly used throughout the Naval Reserve:

ACTIVE DUTY - full-time duty with active military service of the United States other than active duty for training.

ACTIVE DUTY FOR TRAINING - full-time duty with active military service of the United States for training purposes, most commonly the two-week cruise.

INACTIVE DUTY TRAINING - any training, instruction, or duty as prescribed by the Secretary of the Navy, performed by Reservists on inactive duty, with or without compensation, is inactive duty training. For example, drills and approved correspondence courses are part of this type of training.

TEMPORARY ACTIVE DUTY - temporary assignment to full-time active duty for the purpose of performing a special task.

TEAM TRAINING - intended to provide Reservists with training in general knowledge and skills required for all Navymen on active duty. It is not intended to be limited to general drill or battle problem exercises, but to teach seamanship, damage control, first aid, and the like.

ALLOWANCE - the number of personnel by grade and designator or rating authorized to be assigned to pay units of the Naval Reserve in drill pay billets.

ATTACHED - any Reservist who is assigned to a billet within an authorized unit allowance is "attached" to that unit.

ASSOCIATE QUOTA - the number of billets authorized for a unit in addition to its allowance, for training, administrative or procurement support purposes.

ASSOCIATED - any Reservist who is assigned to a billet within an authorized unit associate quota is "associated" with that unit.

APPROPRIATE DUTY - this duty is assigned by naval district commandants to accomplish various special tasks in connection with the Naval Reserve.

ORGANIZED NAVAL RESERVE - comprised of all units included in the approved Table of Organization, both pay and nonpay, which follows the approved curriculum of a supervised training program.

STATUS OF RESERVISTS - every Reservist is in an active, inactive, or retired status.

ACTIVE STATUS - the status of all Ready Reservists and those Standby Reservists who are not on the Inactive Status List. Such Reservists are identified USNR-R, USNR-EV, or USNR-S1.

INACTIVE STATUS - the status of members of the Standby Reserve who are officially placed on the Inactive Status List in accordance with regulations prescribed by the Secretary of the Navy. Such Reservists are identified as USNR-S2.

RETIRED STATUS - the status of all members of the Naval Reserve placed on the Retired Reserve List in accordance with regulations prescribed by the Secretary of the Navy, which includes members on the Honorary Retired List as well as those in Retired Pay Status. Such Reservists are identified as USNR-Ret.

(To be continued)

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Continuation on Mailing List

Particular attention of all Reservists—not on active duty—is directed to the requirement for returning the notice for continuation on mailing list of the Medical News Letter. In many instances, this requirement is overlooked, resulting in interruption of receipt of the News Letter. Please return the notice appearing on pages 39 and 40 of this issue if the News Letter is desired, making sure the form is filled in completely and legibly.

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OCCUPATIONAL MEDICINE

Low-Back Pain

Chronic low-back pain is caused primarily by incompetent ligaments and tendons which do not maintain normal tensile strength. This relaxation causes joint instability and is frequently confused with disc disability and arthritis.

Pain has its origin when weakened ligament and tendon fibers stretch under normal tension and permit an abnormal tension-stimulation of somatic sensory nerves that will not stretch.

The diagnosis is made by trigger point tenderness over specific articular ligaments. The diagnosis is invariably confirmed by intraligamentous tendonous needling with a local anesthetic solution which reproduces the local pain and sometimes specific referred pain, only to disappear within two minutes as anesthesia takes place.

Ligaments. The interspinous ligament is the most important ligament of the spine because it maintains stability while limiting the range of motion of one vertebra upon another. It must be weakened to permit abnormal strain of the spinous articular ligaments, abnormal compression of an intervertebral disc, or the so-called slipped, crushed, or ruptured disc syndrome.

When one vertebra normally glides forward on the articular processes of the adjoining vertebra below, both the interspinous and supraspinous ligaments assume a more diagnonal position without stretching, as the spines of the two vertebrae come slightly closer together. To permit any abnormal forward movement of one vertebra on another, such as occurs in spondylolisthesis and compression of an intervertebral disc, fibers of the interspinous ligament must be torn or stretched, as in chronic relaxation. At the same time, the supraspinous ligament may assume a more diagonal position in moderate cases, but must also be disabled, together with spinous articular ligaments and others, in severe cases. Intraspinous relaxation is frequently accompanied by relaxation of the articular ligaments on one or both sides of the same vertebra. The iliolumbar ligament also is relaxed in lumbosacral joint instability, and the sacro-iliac, sacrospinous, and sacrotuberous ligaments are relaxed in instability of the sacro-iliac joint.

Tendons. A frequent source of lumbar and gluteal pain is weakness of the tendonous attachments of the sacrospinalis muscle to the spine and

transverse processes of the lumbar vertebrae and dorsum of the sacrum. Weakness of the tendonous attachments of the gluteal muscles to the dorsum of the ilium is another common occurrence. Both conditions have been designated erroneously as fibrolipomatous nodules, fibrositis, and herniated fat pads.

Referred Pain - Sciatica. Referred pain into the lower extremities extending to the toes, and sciatica from incompetency of the lumbosacral and sacro-iliac articular ligaments occurs more frequently than from all other sources combined.

During 19 years of observation of 18,000 intraligamentous injections made while diagnosing and treating 1,706 patients, definite pain areas referred from specific ligaments were charted. These have proved to be valuable diagnostic aids because they direct attention to specific disabled ligaments.

Sciatica results when the lower portion of the posterior sacro-iliac, sacrospinous, and sacrotuberous ligaments become excessively incompetent to maintain stability of the sacro-iliac joint. It is accompanied by sciatic nerve tenderness and conducted pain extending to the toes which is distinguishable from the definite areas of referred pain from articular ligaments.

Treatment. Relaxation or incompetency of ligaments and tendons is treated by prolotherapy (rehabilitation of an incompetent structure by induced proliferation of new cells). Prolotherapy is accomplished by intraligamentous injection of a proliferating solution combined with a local anesthetic solution. This stimulates the production of new bone and fibrous tissue cells which strengthens the "weld" of fibrous tissue to bone and permanently eliminates pain and disability. Except for severe cases, treatments can be carried out in the office.

Comment and Statistics. Incompetency of ligaments and tendons follows strains and tearing of fibers when normal tensile strength is not regained. Treatment involves tendons and articular ligaments from the occiput to the feet. Growth of new tissue takes place over a period of about 6 weeks. Following treatment, the patient is usually able to pursue his ordinary activities.

Ages of patients treated during this study ranged from 15 to 88 years. Duration of disability was 3 months to 65 years. Re-evaluation was made two months after treatment and revealed no unfavorable sequelae. Of 1,706 patients treated over a period of 19 years, 82% considered themselves permanently cured. (Hackett, G.S., Low-Back Pain: Indust. Med., 28: 416-419, September 1959)

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Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget (19 June 1958).

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Prevention of Low-Back Pain

Critical study of approximately 3,500 cases of low-back pain followed over a 20-year period revealed the prinicpal unanswered question: How many cases of low-back pain or injuries could have been prevented by selective employment or activity? The aim was to establish a yardstick for preemployment or job placement where, by history and examination, it could be ascertained that a person is predisposed to low-back injury or strain.

Review of the studies might give some idea of the problems and, in turn, help in their solution. Tabulation of preemployment examinations of the low back extended over a 7-year period and involved some 8,500 cases.

Critical preemployment examinations, both general and low-back, were carried out in two plants where both men and women were employed at jobs requiring moderate to heavy lifting. Examinations in both plants covered a thorough history with emphasis on previous back pain and/or injuries, and included a complete physical examination in addition to special examination of the eyes, ears, and back. X-Ray films of the chest and two planes of the low back were made. When questionable findings in the lumbosacral region were observed, oblique projections were made from the right and left sides.

These examinations were approached more as a preplacement examination than as an elimination of the weak or infirm, because these plants freely hire handicapped persons, provided they meet the qualifications for the job. Restrictions are prescribed as to the nature and conditions of an employee's duties as inposed by physical, mental, or emotional limitations he possesses.

Data revealed by the study:

Cases examined ... 8488	Age range in years ... 17-53
Male employees 87%	Average age in years 31
Female employees ... 13%	

X-Ray findings of the first 6,523 cases were:

Congenital anomalies in the lumbosacral region	41.1%
Normal spines	39.93%
Wear-and tear changes in lumbosacral joint	6.3%
Postural curvature	5.0%
Advanced spinal arthritis	3.3%
Structural scoliosis	1.9%
Increased lumbar lordosis	1.3%
Old compression fracture	0.7%
Opaque material in neural canal	0.47%

Overlapping spinal structural abnormalities and/or pathology made accurate classification difficult. Grouping into various categories was based on the most outstanding x-ray finding.

Under congenital defects, the following are listed in the order of their occurrence:

Malformed lumbosacral articulating facets
Spina bifida occulta of the first sacral segment
Supernumerary lumbar vertebrae
Sacralized last lumbar vertebra
Cleft or failure of fusion of the last lumbar vertebra
Spondylolisthesis
Four lumbar vertebrae

Many cases show wear and tear changes of the lumbosacral joint, where there is a settling of the lumbosacral space with resulting arthritic changes. These cases were found to be most susceptible to developing pain in the low back, even from minor or no injury.

Comparison is made with statistics of the x-ray studies of preemployment examinations and the reported series of 3,500 patients who sought relief in the clinic for low-back pain and/or disability.

	Preemployment Examinations Percentage	Low-Back Disability Series, Percentage
Congenital anomalies	41.1	31.1
Arthritis	3.3	15.1
Negative x-ray findings	39.9	13.8
Postural defects	5.0	13.3
Wear-and-tear changes in lumbosacral joint	6.3	2.3
All others	4.4	24.4

On the basis of these examinations, employment was refused to 3.8% of all applicants and 12.7% were assigned to limited or specific duty—duty which the examiner believed could be handled by the applicant without the risk of causing injury to the lower back.

Over the period of study, with increased efficiency of preemployment examinations and past experience, the number of applicants rejected for employment increased and the number of low-back cases reporting to sick call decreased.

X-Ray findings of lumbosacral region in order of importance:

1. Congenital anomalies
   Spondylolisthesis
   Cleft or failure of fusion of last lumbar vertebra

Congenital anomalies (continued)
Sacralized last lumbar vertebra
2. Arthritis
3. Postural defects
4. Wear-and-tear changes in the lumbar spine and/or lumbosacral joint

A program of preemployment examinations of the low-back or lumbosacral area will help identify employment hazards and serve as a basis for job placement. It might be more accurate to term these preplacement rather than preemployment examinations. (Diveley, R. L., Low-Back Pain - Prevention through Medical Examination and Selective Job Placement: A. M. A. Arch. Indust. Health, 19: 572-576, June 1959)

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Conservative Management of Low-Back Pain

Intelligent management of low-back pain by conservative means depends upon accurate diagnosis of the cause of the pain, removal of the cause when possible, and evaluation and treatment of factors which cause the pain, even though they may not be completely correctible.

Accurate diagnosis of low-back pain is one of the most difficult and complex problems in the field of medicine. Because of its complexity there has been a tendency to group all cases together in ill-defined categories—"disc," "low-back strain," or "sacro-iliac."

There have been successive waves of popular diagnosis which have little or no specific meaning, such as "lumbago" (any back pain and stiffness in the back), "sciatica" (any pain radiating down the posterior region of the thigh), and "sacro-iliac strain" (pain in the back with radiation of pain into the posterior region of one thigh). The idea of protruded intervertebral disc has become so popular that almost any back pain has been called a "disc pain." The tendency is to consider most back pains as the result of disc trouble.

Treatment

Particularly in back pain, certain factors indicate physical treatment which is presented from the point of view of the modalities used, including diathermy, massage, and traction.

Physical therapy is not machine therapy. It should be prescribed for a definite pathologic or physiolgic condition which can reasonably be expected to be improved by physical therapy and should not be continued when no benefit is produced.

Acute Pain. Probably the most important factor in relief of pain which usually accompanies muscle spasm during the acute stage, is bedrest with

a firm mattress and a bedboard which covers the entire surface of the spring. A sponge-rubber mattress is satisfactory only when used on a bedboard.

Williams' position of flexion at hips and knees with flexion of the trunk gives relief of pain in many patients, particularly those who have spasm in the iliopsoas muscles. The Williams' brace also is useful in some patients during subacute and chronic stages. Support of the trunk is beneficial in certain acute cases. Taping or a firm belt may be quite useful in relieving pain for those who can be up and around.

Traction in bed is a time-honored treatment; however, it seems that the mild degree of traction which is ordinarily tolerated for a long period is of little benefit. Bedrest is probably more useful than traction. Heavy traction of short duration, in sitting or supine position, may be employed.

Hot packs are of great value in treating pain. Packs of a very high temperature with low water content should be applied frequently, depending on severity of pain. In severe cases packs are applied once every 10 to 15 minutes and continued as long as necessary to relieve pain.

Aspirin and codeine are the stand-by medications; however, sedatives are necessary in the acute stages in order to give the patient relief from severe pain.

Muscle Spasm. This usually accompanies pain, and most of the procedures which are used for pain are also useful for relief of muscle spasm. In addition, guarded passive and active motion within the limits of pain, or just reaching to the limits of pain, is valuable.

Postural exercises in bed in the acute stage are often useful, particularly back flattening and abdominal exercises, provided they do not cause pain. In addition to sedatives, tranquilizers are sometimes helpful. Muscle relaxants are not particularly satisfactory.

When the subacute stage has been reached, massage is added for relaxation of muscle spasm. Massage must be of a sedative type without violent movements which would increase muscle spasm. It is best given by an experienced therapist rather than by a member of the patient's family. Active exercise is then gradually increased. Infrared heat treatment may be used in place of hot packs. Diathermy may be used instead of hot packs, especially if hypertrophic arthritis is present.

Muscle Contracture (subacute and chronic stages). Muscle contractures are important causes for prolonged disability. Many patients with low-back pain are in a flexed position in bed for a long time. This promotes hip-flexion contractures. The ilopsoas is often involved in muscle spasm; in fact, it is probably the most common reason for sciatic scoliosis. The erector spinae muscles are commonly involved and almost regularly show shortening which limits forward flexion. These contractures may be present even after an operation has been performed and the disc removed. Many of these patients get immediate and complete relief from sciatic pain, but

they often continue to exhibit back pain which is more commonly related to the contractures in the back than to hypermobility. The gastrocnemius and soleus muscles also are not infrequently involved in contractures.

Treatment is begun by use of heat. The type of heat used depends upon the type of equipment available, the time the patient has for treatment, and many other factors. Moist heat is preferable to dry heat and may be given in the form of hot packs, whirlpool, or Hubbard tank. Infrared, diathermy, and ultrasound are not of significant use in overcoming contractures. After the tissues have been softened by the use of heat, stretching is employed. Manual stretch is useful in many instances, but is not as efficient as a prolonged stretch. Prolonged stretch is usually given by first stabilizing the part and then applying weights over a long period—half hour, hour, and sometimes more. The most effective method is to devise a technique by which the patient himself can stretch the part. This allows more prolonged treatment because it can be given at home rather than in the physical therapy department.

Muscle Weakness. If muscle weakness is the result of interruption of the nerve by pressure from a protruded disc or tumor, proper treatment is removal of the pressure by surgery as early as possible. However, many of these patients become weak because they must be in bed or, at least, are not carrying out normal activity over fairly long periods. During the acute stage, strengthening exercises may be used to all nonpainful areas in order to prevent deconditioning. The patient should be kept in normal physical condition throughout convalescence so that the recovery period may be shortened and he may return to work at the earliest possible moment. Even a short stay in bed without exercise may produce an astonishing degree of weakness.

During the subacute and chronic stages, strengthening exercises may be used for any weak muscles, starting with postural exercises and stressing back flattening. However, this obviously depends upon the factors that are causing disability. Progressive resistance exercises are undoubtedly the best method for producing hypertrophy of muscles and, thereby, producing increased strength. Bracing is to be avoided when possible. Braces tend to promote weakness and interfere with methods of developing strength, and they often give the patient so much psychologic support that it is very difficult to get him to discard them when they are no longer needed. Often, patients have to be readmitted to the hospital in order to get rid of a brace.

Manipulation. Manipulation is performed for relief of lumbosacral pain, supposedly and probably, by opening the intervertebral space enough to allow a disc to recede. Good results have been obtained in about one-third of the patients. This manipulation is most useful in the patient who has a sudden onset of acute back pain after a bending, twisting motion. It is not the result of straining to lift a heavy object—usually he doesn't get to lift the object he was reaching for.

In the facet syndrome or subluxation of the sacro-iliac joint manipulation, the patient is laid on his side and a rotary motion of the pelvis is produced. Some effective results are reported.

Conclusion

In carrying out conservative management of cases of back pain, the first and most important requirement is establishment of an accurate diagnosis—not only of the cause of the disease or injury, but also of the factors that are influencing the case at the time of examination, either prolonging the disability or making the patient incapable of returning to work. If these factors are evaluated and treated rationally, progress can be accomplished. Most patients can be treated conservatively; however, this does not mean using a routine back treatment or ordering a physical therapist to "give physiotherapy to the back." Treatment must be prescribed specifically by the physician to correct the pathologic conditions found on examination. Treatment must be changed as these conditions change. If the treatment is not effective, it should be changed or discontinued. When relief can be obtained and adequate instruction given to the patient as to how he should carry out his activities, or if his type of work is changed to avoid what causes his disability, he may be able to continue for long periods without further trouble.

Back pain is a difficult problem to solve by conservative treatment, but if approached analytically, much can be accomplished. (Knapp, M. E., Low-Back Pain - Conservative Management: Arch. Indust. Health, 19: 577-584, June 1959)

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Changes in Threshold Limit Values

Threshold limit values contained in BuMed Instruction 6260.5, Change 2, of 19 December 1957, were taken from values adopted at the 19th Annual Meeting of the American Conference of Governmental Industrial Hygienists in April 1957. Changes adopted by the 20th Annual Meeting were noted in the Medical News Letter, Vol. 32, No. 6, dated 19 September 1958. Changes as listed in the table were adopted by the 21st Annual Meeting in April 1959, and published in the Archives of Industrial Health, September 1959. Changes adopted in 1958 have been included to bring BuMed Instruction 6260.5 up to date.

"Threshold limits should be used as guides in the control of health hazards and should not be regarded as fine lines between safe and dangerous concentrations. They represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect. The values listed refer to time weighted average concentrations for a normal work-day. The amount by which these figures may be

exceeded for short periods without injury to health depends upon a number of factors, such as the nature of the contaminant, whether very high concentrations even for short periods produce acute poisoning, whether the effects are cumulative, the frequency with which high concentrations occur,

Table

Change values listed under "Established Values" as follows:

	PPM	Approx. Mg. per Cu. M.
Bromine	0.1	0.7
Chloroform (trichloromethane)	50	240
Chloropicrin	0.1	0.7
Nitric acid	10	25
Mesityl oxide	25	100

Add to "Established Values" list the following:

Gases and Vapors

	PPM	Approx. Mg. per Cu. M.
Acetylene tetrabromide	1	14
Acrylonitrile	20	45
a-Methyl styrene	100	480
Monomethyl aniline	2	9
Paradichlorobenzene	75	450
Propylene oxide	100	240
Tertiary butyl alcohol	100	300
Tolylene-2,4-diisocyanate	0.1	0.7
Triethylamine	25	100
Vinyl toluene	100	480
Xylidine	5	25

Toxic Dusts, Fumes, and Mists	Micrograms per Cu. M.
Beryllium	2

Add to "Tentative Threshold Limit Values" the following:

	PPM	Approx. Mg. per Cu. M.
Chlorine dioxide	0.1	0.3
1,1-Dimethyl hydrazine	0.5	1
sec-Hexyl acetate	100	590
Phosphoric acid		1
n-Propyl nitrate	25	110
1,2,3-Trichloropropane	50	300
Triorthocresyl phosphate		0.1

and the duration of such periods. All must be taken into consideration in arriving at a decision as to whether a hazardous situation exists. Special consideration should be given to the application of these values in the evaluation of the health hazards which may be associated with exposure to combinations of two or more substances.

"Threshold limits are based on the best available information from industrial experience, from experimental studies, and, when possible, from a combination of the two. These values are based on various criteria of toxic effects or on marked discomfort; thus, they should not be used as a common denominator of toxicity, nor should they be considered as the sole criterion in proving or disproving diagnosis of suspceted occupational diseases.

"These limits are intended for use in the field of industrial hygiene and should be employed by persons trained in this field. They are not intended for use, or for modification for use, in the evaluation or control of community air pollution or air-pollution nuisances.

"These values are reviewed annually by the Committee on Threshold Limits for changes, revisions, or additions as further information becomes available. The Committee welcomes the suggestion of substances to be added to the list and also comments, references, or reports of experiences with these materials."

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Radioactive Waste Materials

By 1980, industry will have to find safe ways to segregate 100 million gallons of waste materials having a high radioactivity equal to 100 billion curies, Dr. Abel Wolman of the Johns Hopkins University testified before the Joint Congressional Committee on Atomic Energy. Dr. Wolman said that rapid development of the atomic energy industry is in no small measure contingent on finding safe and economical methods of waste disposition. (Signs and Symptoms of Trends in Public Health: Pub. Health Rep., 74: 594, July 1959)

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Earplugs Shut Out Deafening Noises

Comfortable earplugs to shut out deafening noises are recommended by Dr. Aram Glorig, Head, American Academy of the Ophthalmology and Otolaryngology's research center on noise in industry. He finds that workers who wear earplugs have normal hearing at the end of a working day. Those who do not wear plugs lose hearing, particularly at 4000 cycles.

Some workers object to wearing earplugs, fearing that warning cries of danger would go unheard. Glorig says that the opposite is true. Loud noises are shut out by the plugs and speech is made more intelligible. (Signs and Symptoms of Trends in Public Health: Pub. Health Rep., 74: 594, July 1959)

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